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Indian Standard

SPECIFICATION FOR CAST IRON ROLLS

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SPECIFICATION FOR CAST IRON ROLLS

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AMENDMENT NO. 1 NOVEMBER 2012
TO
IS 6629 : 1972 SPECIFICATION FOR CAST
IRON ROLLS

(Page 4, clause 6.1) — Insert the following at end of clause:

‘d) High hardness (clean chill and D.P.) rolls to be mirror-finished.’

[Page 6, Table 1, Sl No. (iv)] — Insert the following new Grade and Hardness of Barrel, Shore ‘C’ Scale.

‘S.G. (Acicular) — 65-80’

(Page 6, clause 11.1) — Insert the following after the first sentence.

‘Roll end face should also indicate drive end and non-drive end.’

Indian Standard

SPECIFICATION FOR CAST IRON ROLLS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 12 October 1972, after the draft finalized by the Cast Iron and Malleable Cast Iron Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard covers the requirements for cast iron rolls. A wide range of compositions is used to obtain the desired characteristics in cast iron rolls, such as hardness, toughness, resistance to spalling and heat, hardness-gradient and grain structure.

0.3 For information of the users, general description of the various types of rolls included in this standard is given in Appendix A.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements of cast iron rolls for metallurgical industries.

2. SUPPLY OF MATERIAL

2.1 General requirements relating to the supply of material shall be as laid down in IS: 1387-1967†.

3. GRADES

3.1 There shall be five types of cast iron rolls, namely:

- a) Clear chill rolls (C. C.),
- b) Indefinite chill rolls (I. C.),

*Rules for rounding off numerical values (*revised*).

†General requirements for supply of metallurgical materials (*first revision*).

- c) Grain iron rolls (G. I.),
- d) S. G. iron rolls, and
- e) Double poured rolls:
 - i) High alloy (D. P.),
 - ii) High alloy/S. G. Core (D. P. S.).

3.2 Each type of cast iron rolls shall have various grades as specified below:

<i>Type</i>	<i>Grade</i>
a) Clear chill rolls	C. C. I, C. C. II, C. C. III, C. C. IV
b) Indefinite chill rolls	I. C. I, I. C. II, I. C. III
c) Grain iron rolls	G. I. I, G. I. II
d) S. G. iron rolls	S. G. I, S. G. II, S. G. III
e) Double poured rolls:	
i) High alloy	D. P. I, D. P. II, D. P. III, D. P. IV
ii) High alloy/S. G. core	D. P. S. I, D. P. S. II, D. P. S. III, D. P. S. IV

4. MANUFACTURE

4.1 Unless otherwise agreed to between the purchaser and the manufacturer, the method of manufacture and heat-treatment shall be left to the discretion of the manufacturer.

5. CHEMICAL COMPOSITION

5.1 Unless otherwise agreed to between the purchaser and the manufacturer the chemical composition shall be left to the discretion of the manufacturer.

6. FINISH

6.1 Rolls shall be supplied in any one of the following conditions as agreed to between the purchaser and the manufacturer:

- a) Neck to be either machine-finished or ground-finished as required;
- b) Wobbler to be machine-finished or as cast as required; and
- c) Barrel to be rough-finished, smooth-finished or ground-finished as required by the customer, except for the barrel of the grooved rolls, which shall be supplied in rough-finished condition.

7. TOLERANCES

7.1 Tolerance on size shall be specified in the order or on the drawings. If nothing is specified, these shall be as follows:

Neck	± 0.75 mm
Wobbler	± 2 mm
Barrel diameter	± 1 percent

7.2 Tolerance on the length of neck, wobbler and barrel shall be as specified on the drawings supplied by the purchaser or as mutually agreed to between the manufacturer and the purchaser.

8. FREEDOM FROM DEFECTS

8.1 Working surfaces of barrel and journal of machine finished rolls shall be free from surface defects. However, minor defects may be rectified or left as such as agreed to between the purchaser and the manufacturer.

8.1.1 Minor defects shall be permitted on the non-working surfaces of all rolls.

9. HARDNESS TEST

9.1 Each roll shall be tested for hardness and shall be within the limits specified in Table 1. The hardness shall be measured on the barrel surface. The stage of processing where hardness test is conducted and the number and location of tests may be as agreed to between the purchaser and the manufacturer. A sufficient number of hardness tests shall be made to ensure required uniformity, both longitudinally and circumferentially.

9.2 Hardness values shall be determined preferably by Shore 'C' scleroscope.

10. CHILL DEPTH

10.1 Chill depth for clear chill rolls shall be as agreed to between the purchaser and the manufacturer.

NOTE — Chill depth is the distance from the machined surface to the depth where three or more first graphite points are visible by the naked eye on a 10 mm long line perpendicular to the radius. Other individual graphite points are not to be taken into consideration.

10.2 Chill depth shall be measured at the end face of the barrel.

TABLE 1 CLASSIFICATION OF CAST IRON ROLLS

(Clause 9.1)

SL No.	TYPE	GRADE	HARDNESS OF BARREL SHORE 'C' SCALE
i)	Clear chill rolls (alloyed or unalloyed)	C. C. I C. C. II C. C. III	58-65 65-70 70-75
ii)	Indefinite chill rolls	I. C. I I. C. II I. C. III	45-55 55-65 65-75
iii)	Grain iron rolls	G. I. I G. I. II	30-40 40-50
iv)	S. G. iron rolls	S. G. I S. G. II	45-55 55-65
v)	Double poured rolls:		
	a) High alloy	D. P. I D. P. II D. P. III D. P. IV	65-70 70-75 75-80 80-90
	b) High alloy/S. G. core	D. P. S. I D. P. S. II D. P. S. III D. P. S. IV	65-70 70-75 75-80 80-90

11. MARKING AND PACKING

11.1 Roll numbers shall be marked on both the end faces of the wobblers. The manufacturer's name or trade-mark shall also be indicated at one of the end faces. Each roll shall be suitably packed to ensure delivery in desired condition as required by the customer.

11.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

11.2 Packing — Each roll shall be suitably packed to ensure delivery in good condition.

APPENDIX A

(Clause 0.3)

GENERAL DESCRIPTION OF CAST IRON ROLLS

A-1. CLEAR CHILL ROLLS

A-1.1 Clear chill rolls have the following three working zones:

- a) *Clear Chill Zone* — Comprises of metallic matrix and carbide without showing any micrographite,
- b) *Mottled Zone* — Transition zone between clear chill zone and grey core, in which carbide content decreases continuously with corresponding increase in graphite towards the core, and
- c) *Grey Zone* — Comprises of grey iron.

A-2. INDEFINITE CHILL ROLLS

A-2.1 The working layer of indefinite chill rolls comprises of metallic matrix, carbide in radial form with fine flake graphite dispersed in between the carbide. The quantity of graphite increases from the surface to the core.

A-3. GRAIN IRON ROLLS

A-3.1 Working layer of grain iron rolls comprises of metallic matrix, graphite with or without some quantity of free carbide.

A-4. S. G. IRON ROLLS

A-4.1 S. G. iron rolls comprise of metallic matrix, carbide and graphite nodules.

A-5. DOUBLE POURED ROLLS

A-5.1 In double poured rolls, the core of the roll is usually comprised of soft grey iron, but rolls exposed to high mechanical stress require spheroidal graphite material.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Conversion
Force	newton	N	1 N = 1 kg.1 m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

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